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5th INTERNATIONAL CONFERENCE ON ADVANCES IN BIOTECHNOLOGY - SUSTAINABLE INNOVATIONS TOWARDS VIKSIT BHARAT VISION

Organized by

POST GRADUATE DEPARTMENT OF BIOTECHNOLOGY

DWARAKA DOSS GOVERDHAN DOSS VAISHNAV COLLEGE
(Autonomous)
Re-accredited by NAAC with A++ Grade, Affiliated to University of Madras
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ABSTRACT PROCEEDINGS OF

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LICACHALCONE A AND ITS DERIVATIVES PROMOTE NEURONAL DIFFERENTIATION OF AN EMBRYONIC STEM CELL LINE

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Abstract:

The etiology and incidence of neurodegenerative illness have reached their pinnacle in the realm of modern medicine. The main factor behind the neurodegenerative disease is neuronal loss. The current treatment is focused on the induction of neuronal differentiation as a therapeutic solution to promote neuronal regeneration. Small molecules promoting the neuronal differentiation of embryonic stem cells in the central nervous system (CNS) can be used as regenerative medicine. Licochalcone A (1) is a major polyphenolic compound from *Glycyrrhiza inflata* (licorice). Licochalcone A exerts multiple biological activities such as anti-oxidative, neuroprotective, antibacterial, anti-stroke, osteogenic, anti-inflammatory activity, and antidepressant activity. These findings suggest that Licochalcone A is an ideal candidate for treating neurological and neurodegenerative diseases. Although the crystal structure of LA has been revealed, there have been few attempts to modify its structure for improving its neuritogenic and anti-neurodegenerative activity. To the best of our knowledge, we report for the first time that Licochalcone A **(1)** and its derivatives (**2**) or (**3**) or their combination induced the differentiation of mammalian P19 embryonic stem cells to neuronal cell lines in vitro [Durairajan et al. 2019 Indian Patent Appl. 201941038499]. By screening a series of Licochalcone A synthetic analogs 2 or 3 or 4, we identified only 1, 2, and 3 but not 4 induced neuronal differentiation of pluripotent P19 cells at 5 μM concentration of each compound from 1 to 7th day. The present study thus provides an effective method for reprogramming mouse embryonic stem cells toward neuronal cells, using Licochalcone-A and/or its derivatives.

Keywords: Neurodegenerative diseases, Licachalcone A, Neurogenesis, Neuronal Differentiation, ERK pathway.